

Report No. S-69-44

5220

December, 1969

SEED AND CONE INSECT DAMAGE IN THE LAKE STATES
RED PINE SEED PRODUCTION AREAS - 1969

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ABSTRACT

Seed and cone insects, Conophthorus resinosae Hopk., Dioryctria disclusa Heinrich, Eucosma monitorana Heinrich, Laspeyresia toreata Grote, and Rubsaamenia spp. caused damage to 6 percent to 91 percent of the cones in ten red pine, Pinus resinosa Ait., seed production areas in the Lake States. About 33 percent of the estimated total cone crop (1873 bushels) was completely destroyed. In addition, an undetermined amount of seed loss was sustained from partially damaged cones.

The samples consisted of nearly mature, closed red pine cones collected from the branches of a single mid-crown whorl from each of 15 trees per seed production area.

INTRODUCTION

Each year since 1962 cones from various seed production areas (SPAs) on the National Forests in the Lake States have been sampled for seed and cone insect damage. The purpose of the survey is to provide the land manager with estimates of losses caused by insects to cone production in these areas. The 1969 survey was made on ten red pine, Pinus resinosa Ait., seed production areas. ^{1/}

This is a cooperative project with the Eastern Region of the National Forest System and the North Central Forest Experiment Station.

METHODS

The sampling procedure was designed by the North Central Forest Experiment Station staff. Briefly, the samples are taken in July or August and consist of all maturing cones from one mid-crown branch whorl from each of the 15 trees selected in each SPA. The cones are picked from the branches, bagged, and tagged for shipment to the St. Paul Field Office where they are examined to determine the frequency and cause of damage.

RESULTS AND DISCUSSION

Two classes of damage are identified; cone mortality and partial damage to seeds and cones.

Cone mortality is caused by the red pine cone beetle, Conophthorus resinosae Hopk., and two cone worms, Dioryctria disclusa Heinrich and Eucosma monitorana Heinrich. No seed is obtained from these cones. The percentage of cones destroyed varies among the SPAs and ranges from 3 percent to 87 percent (Table I). The red pine cone beetle is the primary cause of cone mortality (2 percent to 84 percent) in all ten areas sampled.

The estimated cone crop varies among SPAs from 30 bushels, to 751 bushels (Table I). An estimated total cone crop for all areas combined is 1873 bushels, and about 616 bushels (33 percent) of that cone crop was totally destroyed by insects.

^{1/} In addition Rosen Dam SPA on the Nicolet National Forest was visited but not sampled because no cones could be seen from the ground. The area is not used in the calculations.

TABLE 1. -- Cones Destroyed by Cone Insects in Red Pine Seed Production Areas - 1969

Seed Production Area	Total No. Cones Sampled	Cones Destroyed By			Ave. No. Cones per Mid-crown Whorl	Estimated ^{a/} Cone Crop in Total bu. Damaged bu.
		<u>Conophthorus</u> <u>resinosa</u> %	<u>Dioryctria</u> <u>disclusa</u> %	<u>Eucosma</u> <u>monitorana</u> %		
NICOLET N.F.						
Farr Lake	49	59	0	6	65	30
Cary Dam	320	30	5	2	37	140
CHIPPEWA N.F.						
Birch Hill	216	49	5	3	57	163
Portage Lake	214	22	13	4	39	267
SUPERIOR N.F.						
Isabella R.D.	127	4	0	0	4	79
OTTAWA N.F.						
Norway Lake	215	84	2	1	87	90
HIAWATHA N.F.						
Black Creek	271	44	2	0	46	156
Ogontz	162	77	0	0	77	117
HURON N.F.						
Highway 144	101	64	4	3	71	80
MANISTEE N.F.						
T21, R12, Sec. 25	105	2	0	1	3	151
TOTAL						
					1873	616

^{a/} Method of calculations in Rept. S-69-1 (Fowler and Erickson, 1969)

Some seeds and cones are partially damaged by two additional species. Laspeyresia toreata Grote, larvae consume 4 to 10 seeds each and only one or two larvae are normally found per infested cone. Since red pine cones average 40 seeds each, usually less than half the seeds are destroyed. Damage among SPAs ranged from less than 1 percent to 8 percent (Table 2).

Rubsaamenai spp. larvae usually feed on cone scales, but seed damage may occur when larvae are numerous. Table 2 shows that 0 percent to 4 percent of the cones in each area were damaged by this genus. Only 0 percent to 2 percent of the cones were damaged by unidentified causes.

Table 2.-- Partially Damaged Cones in Red Pine Seed Production Areas - 1969

Seed Production Area	Total No. Cones Sampled	Cones Damaged By				Total %
		<u>Laspeyresia</u> <u>toreuta</u> %	<u>Rubsaamenia</u> <u>spp.</u> %	Other %		
NICOLET N.F.						
Farr Lake	49	4	2	0		6
Cary Dam	320	4	2	1		7
CHIPPEWA N.F.						
Birch Hill	216	8	2	0		10
Portage Lake	214	6	2	1		9
SUPERIOR N.F.						
Isabella R.D.	127	1	1	0		2
OTTAWA N.F.						
Norway Lake	215	1	0	0		4
HIAWATHA N.F.						
Black Creek	271	3	4	2		5
Ogontz	162	3	1	0		4
HURON N.F.						
Highway 144	101	8	3	0		11
MANISTEE N.F.						
T21, R12, Sec. 25	105	1	2	1		4

REFERENCES

Fowler, R.F. and G.W. Erickson. 1969 Evaluation of the seed and cone insect situation in the Lake States seed production areas-1969. USDA Forest Service, NA S&PF, St. Paul Field Office Report S-69-1. 7 pp.